ABSTRACT OF THE DISCLOSURE

A detector for detecting neutrons and gamma radiation includes a cathode that defines an interior surface and an interior volume. A conductive neutron-capturing layer is disposed on the interior surface of the cathode and a plastic housing surrounds the cathode. A plastic lid is attached to the housing and encloses the interior volume of the cathode forming an ionization chamber, into the center of which an anode extends from the plastic lid. A working gas is disposed within the ionization chamber and a high biasing voltage is connected to the cathode. Processing electronics are coupled to the anode and process current pulses which are converted into Gaussian pulses, which are either counted as neutrons or integrated as gammas, in response to whether pulse amplitude crosses a neutron threshold. The detector according to the invention may be readily fabricated into single or multilayer detector arrays.